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Reform Needs to Happen PFAST: The Importance of Federal Per- and Polyfluoroalkyl Substance Regulation

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REFORM NEEDS TO HAPPEN PFAST: THE IMPORTANCE OF FEDERAL PER- AND POLYFLUOROALKYL SUBSTANCE REGULATION

I. INDUSTRIAL POLLUTION IS IN OUR BLOOD—LITERALLY.

Parkersburg, West Virginia, is the first known location of per- and polyfluoroalkyl substance ("PFAS") contamination.[1] A DuPont plant manufactured perfluorooctanesulfonic acid ("PFOS"), a member of the PFAS

[1] Mariah Blake, *Welcome to Beautiful Parkersburg, West Virginia*, HUFFINGTON POST HIGHLINE (Aug. 27, 2015), https://highline.huffingtonpost.com/articles/en/welcome-to-beautiful-parkersburg/.

chemical family, to meet the needs of the growing plastic and consumer chemical industry, most notably Teflon cookware.[2] Once DuPont began to develop PFOS consumer products, the company also tested the toxicity of PFOS.[3] The first round of toxicity lab results concluded PFOS was toxic and should be "handled with extreme care."[4] DuPont's internal reports all concluded PFOS's toxicity posed a great danger.[5] In fact, DuPont tested various PFAS family substances on rats, monkeys, and even humans as test subjects.[6] One study even had humans smoke PFOS-laced cigarettes and nine of the ten subjects were sick for hours after the slight PFOS exposure.[7]

In the midst of DuPont's PFOS toxicity studies, DuPont employees directly handled PFOS and its resulting waste without occupational safety measures.[8] The Parkersburg DuPont plant also continually dumped the PFOS waste into both the nearby Ohio River and the Atlantic Ocean by way of PFOS waste drums.[9] Soon after DuPont manufactured PFOS, employees began to get sick.[10] Many DuPont employees complained of headaches, nausea, and breathing issues, similar to the side effects experienced in its previous cigarette study.[11] Pregnant employees who directly handled PFOS delivered children with severe birth defects.[12] In the absence of any laws regulating PFAS, DuPont did not notify the Environmental Protection Agency ("EPA") or the public despite the complaints and signs of serious health consequences.[13] Even worse, DuPont lied about PFOS's toxicity to the employees working directly with the chemical's production.[14] Rather, DuPont assured employees that PFOS was not hazardous to any employee and claimed PFOS had no adverse health impacts.[15]

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2 *Parkersburg, West Virginia, Per- and Polyfluoroalkyl Substances,* NE. UNIV. SOC. SCI. ENV'T HEALTH RSCH. INST., https://pfasproject.com/parkersburg-west-virginia/ (last visited Aug. 30, 2020).

3 Blake, *supra* note 1; *DuPont Hid Teflon Pollution for Decades*, ENV'T WORKING GRP. (Dec. 13, 2002), https://www.ewg.org/research/dupont-hid-teflon-pollution-decades.

4 Sharon Lerner, *The Teflon Toxin*, INTERCEPT (Aug. 11, 2015), [hereinafter Lerner, *The Teflon Toxin*], https://theintercept.com/2015/08/11/dupont-chemistry-deception/.

5 *Id.*

6 *Id.*

7 *Id.*

8 Blake, *supra* note 1.

9 Lerner, *The Teflon Toxin*, *supra* note 4.

10 *Id.*

11 Blake, *supra* note 1; Lerner, *The Teflon Toxin*, *supra* note 4.

12 Lerner, *The Teflon Toxin*, *supra* note 4.

13 Taylor Sisk, *A Lasting Legacy: DuPont, C8 Contamination and the Community of Parkersburg Left To Grapple with the Consequences*, ENV'T HEALTH NEWS (Jan. 7, 2020), https://www.ehn.org/dupont-c8-parkersburg-2644262065.html?rebelltitem=6#rebelltitem6.

14 *Id.*

15 Blake, *supra* note 1.

Several years later, the larger Parkersburg community, not just DuPont employees, began to suffer from similar, yet rare, illnesses.[16] Testicular cancer, kidney cancer, thyroid disease, high cholesterol, and ulcerative collitis were among the most "common" in the community.[17] Family farms watched helplessly as their livestock died prematurely from rare and bizarre deformities.[18] As the health crisis intensified, members of the community began searching for answers.[19] What was making them sick? The Parkersburg community began to question DuPont.

Prior to the health crisis, DuPont conducted its own scientific studies on potential health impacts of PFOS.[20] The results were disturbing. DuPont's own studies showed that PFOS exposure on rats and rabbits caused serious negative health effects, including death from liver diseases.[21] DuPont should have alerted its employees and the Parkersburg community of its scientific findings, especially because of the growing community concern. Information regarding the dangers associated with PFOS should have been released to the public. Protections to prohibit future pollution discharge and occupational safety should have existed. However, DuPont kept the PFOS study a secret for decades while the "forever chemical" PFOS continued to flow into the Ohio River, slowly polluting communities downstream as well as connecting waterbodies.[22]

Industrial pollution impacts every single person in the world. Chemical pollution leaves lasting, harmful effects on current and future generations. The chemical family known as per- and polyfluroralkyl substances,[23] commonly known as PFAS, leaves a lasting impact on the world. PFAS receieved the nickname "forever chemical"[24] because the chemical is indestructable.[25] PFAS does not break down and is difficult to eliminate from the environment.[26] Unless

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16 *Id.*

17 *Id.*

18 *Id.*

19 *Id.*

20 *What Are PFAS Chemicals?*, ENV'T WORKING GRP., https://www.ewg.org/pfaschemicals/what-are-forever-chemicals.html (last visited Aug. 30, 2020).

21 *PFAS Timeline*, ENV'T WORKING GRP., https://www.ewg.org/pfastimeline/ (last visited Aug. 30, 2020).

22 *Id.*

23 PFAS will be referred to in the singular tense for the remainder of this paper. As a reminder to the reader, PFAS is a family of chemical substances consisting of many chemicals.

24 Tom Perkins, *The "Forever Chemicals" Fueling a Public Health Crisis in Drinking Water*, GUARDIAN (Feb. 3, 2020, 5:00 AM), https://www.theguardian.com/society/2020/feb/03/pfas-forever-chemicals-what-are-they; *see also*, Michelle Cohen Marill, *Scientists Fight Back Against Toxic "Forever" Chemicals*, WIRED (Jan. 1, 2020, 9:00 AM), [hereinafter Marill, *Scientists Fight Back*], https://www.wired.com/story/scientists-fight-back-against-toxic-forever-chemicals/.

25 Marill, *Scientists Fight Back*, *supra* note 24.

26 Perkins, *supra* note 24.

affirmative cleanup action occurs, PFAS persists in the environment unchanged because of its resistance to extreme temperatures.[27]

Because PFAS remains in the environment unchanged, PFAS has been found in drinking water sources and popular foods.[28] Through the consumption of water and foods containing PFAS, the harmful chemical enters the human bloodstream.[29] In fact, PFAS-contaminated blood is widespread and is not limited to areas where PFAS pollution originated.[30] As PFAS accumulates in the body through more exposure, one's risk of getting sick increases.[31] The accumulation and build up of PFAS in the body is known as bioaccumulation.[32] Despite the widespread PFAS exposure, the United States Federal Government has failed to take substantial action to protect its citizens from this dangerous chemical family. This Note identifies relevant and current federal environmental laws that could include PFAS and suggests how Congress and EPA can address the harmful, widespread contamination of PFAS.

PFAS is a large family of different individual chemicals.[33] For the purposes of this Note, PFAS refers to the family of chemicals and not any one individual chemical. Perflurooctanoic acid[34] ("PFOA") and PFOS[35], individual chemicals within the PFAS family, are often referenced in this Note. PFOS and PFOA are the two most commonly manufactured PFAS chemicals and cause much of the widespread contamination and pollution.[36] While PFOS and PFOA are used as specific examples, this Note focuses on the regulation of the PFAS family, generally.

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[27] *See* Kerri Jansen, *"Forever Chemicals" No More? These Technologies Aim To Destroy PFAS in Water*, CHEM. & ENG'G NEWS (Mar. 25, 2019), https://cen.acs.org/environment/persistent-pollutants/Forever-chemicals-technologies-aim-destroy/97/i12.

[28] Marill, *Scientists Fight Back*, *supra* note 24.

[29] Michelle Cohen Marill, *Forever Chemicals Are in Your Popcorn and Your Blood*, WIRED (Oct. 10, 2019), [hereinafter Marill, *Forever Chemicals Are in Your Popcorn and Your Blood*], https://www.wired.com/story/pfas-forever-chemicals-are-in-your-popcornand-your-blood/; *see also PFAS Blood Testing*, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (June 24, 2020), https://www.atsdr.cdc.gov/pfas/pfas-blood-testing.html.

[30] Perkins, *supra* note 24.

[31] Marill, *Forever Chemicals Are in Your Popcorn and Your Blood*, *supra* note 29.

[32] The accumulation over time of a substance and especially a contaminant (such as a pesticide or heavy metal) in a living organism. *Bioaccumulation*, MERRIAM-WEBSTER'S DICTIONARY, https://www.merriam-webster.com/dictionary/bioaccumulation (last visited Aug. 30, 2020).

[33] *Basic Information on PFAS*, U.S. ENV'T PROT. AGENCY (Dec. 6, 2018), https://www.epa.gov/pfas/basic-information-pfas.

[34] *Perfluorooctanoic Acid*, PUBCHEM, https://pubchem.ncbi.nlm.nih.gov/compound/Perfluorooctanoic-acid (last visited Aug. 30, 2020).

[35] *Perfluorooctanesulfonic Acid*, PUBCHEM, https://pubchem.ncbi.nlm.nih.gov/compound/Perfluorooctanesulfonic-acid (last visited Aug. 30, 2020).

[36] *See What Are PFAS Chemicals?*, *supra* note 20.

The tragic and reckless PFAS pollution in Parkersburg, West Virginia, is not an isolated incident. Indeed, growing awareness of PFAS pollution exists, evidenced by the documentary *The Devil We Know* on Netflix and the recent movie *Dark Waters*.[37] New locations with PFAS contamination in drinking water systems and U.S. Military bases are identified nearly every day.[38] PFAS cannot be contained once released into the environment—it may travel across the country due to the resiliency of its chemical composition.[39] As a result, traces of PFAS in drinking water supplies are found in locations great distances from PFAS manufacturing.[40]

This Note will explore two options the federal government may take to regulate the PFAS family. Part II discusses the basic chemistry of PFAS and why PFAS is used for consumer products. Part II also discusses the short and uneventful history of PFAS regulation at the federal level. Part III introduces two existing federal environmental laws that regulate chemical families similar to PFAS: The Toxic Substance Control Act ("TSCA") and Comprehensive Environmental Response Compensation and Liability Act ("CERCLA"). This Note discusses EPA's role in the regulation of chemical substances under TSCA and CERCLA, specifically focusing on establishing toxicity limits (in parts per billion (ppb) or parts per trillion (ppt)) and the important designation of chemicals as a "harmful substance" and "high priority." Part IV outlines a regulatory framework to protect human health and the environment from further PFAS pollution and exposure. Section IV.A uses the PCB chemical family as a model for why the regulation of an entire family is necessary and how TSCA and CERCLA successfully regulate the PCB chemical family. Section IV.B explains (1) why the regulation of *all* PFAS is necessary and (2) why TSCA and CERCLA are the most effective federal environmental laws to protect the public from future PFAS contamination and will facilitate effective cleanup of pre-existing PFAS contamination.

II. WHAT IS PFAS?

Per- and polyfluoroalkyl substances, PFAS, comprise a class of over 6,000 different chemicals with very similar chemical compositions and properties.[41] As noted above, PFOS and PFOA are common individual chemical

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37 THE DEVIL WE KNOW (Atlas Films 2018); DARK WATERS (Focus Features 2019).

38 *See generally Interactive Map: PFAS Contamination in the United States*, ENV'T WORKING GRP. (July 20, 2020), [hereinafter *EWG Interactive Map*], https://www.ewg.org/interactive-maps/pfas_contamination/.

39 Perkins, *supra* note 24.

40 *See generally* Bill Walker, *Update: Mapping the Expanding PFAS Crisis*, ENV'T WORKING GRP. (Apr. 18, 2018), https://www.ewg.org/research/update-mapping-expanding-pfas-crisis.

41 *PFAS Master List of PFAS Substances*, U.S. ENV'T PROT. AGENCY, https://comptox.epa.gov/dashboard/chemical_lists/pfasmaster (last visited Aug. 30, 2020).

substances in the PFAS family.[42] The PFAS class is an organic carbon chain with a "tail" of fluorine atoms[43] bonded to a carbon chain and a carboxyl functional group head.[44] While slight variations for each different substance exist,[45] the basic formula includes (1) a carbon chain consisting of at least two carbon molecules with (2) a tail carbon forming a carboxyl or sulfur group and (3) the remainder of the carbons bonded to neighboring carbons and fluorine atoms.[46]

Figure 1:

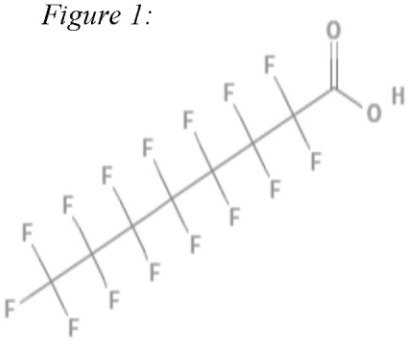
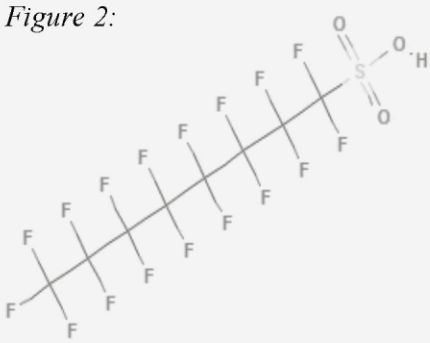


Figure 2:



Significant chemical characteristics of PFAS molecules include their ability to both repel and attract water simultaneously, depending upon the molecule's position in the water.[47] The water attraction properties of this molecule result in unique characteristics, not common among most chemical substances. The "forever chemical" nickname is a result of PFAS's chemical

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[42] U.S. ENV'T PROT. AGENCY, TECHNICAL FACT SHEET—PERFLUOROOCTANE SULFONATE (PFOS) AND PERFLUOROOCTANOIC ACID (PFOA) 1 (2017), https://www.epa.gov/sites/production/files/2017-12/documents/ffrrofactsheet_contaminants_pfos_pfoa_11-20-17_508_0.pdf.

[43] Organic compounds are made up of carbon chains. Carbon atoms make four bonds in their stable state. Often, each carbon bonds to its two neighboring carbon atoms and two hydrogens (which only forms one bond) for the four bonds. What is unique about the PFAS family is that the hydrogens have been replaced by fluorine atoms.

[44] *Per- and Polyfluoroalkyl Substances Overview and Prevalence*, AM. WATER WORKS ASS'N 1, 1 (Aug. 12, 2019), https://www.awwa.org/Portals/0/AWWA/ETS/Resources/Per-andPolyfluoroalkylSubstances(PFAS)-OverviewandPrevalence.pdf?ver=2019-08-14-090234-873.

[45] Variations are a result of the length of the carbon chain, introduction of other organic functional groups, and differing bonds among the atoms in the molecule.

[46] *Figure 1: 2-D Structure, Perfluorooctanoic Acid*, PUBCHEM, https://pubchem.ncbi.nlm.nih.gov/compound/Perfluorooctanoic-acid (last visited Aug. 30, 2020); *Figure 2: 2-D Structure, Perfluorooctanesuflonic Acid*, PUBCHEM, https://pubchem.ncbi.nlm.nih.gov/compound/Perfluorooctanesulfonic-acid (last visited Aug. 30, 2020).

[47] The head portion of the molecule, the carboxyl group, is hydrophilic, also meaning water soluble. The tail portion of the molecule, the remaining fluorine-carbon portion is hydrophobic, meaning that it repels water.

composition. The PFAS family of molecules is bioaccumulative (as noted above), soluble in water,[48] resistant to high temperatures (as noted above), and resistant to biodegradation[49] The chemical characteristics make this chemical long-lasting, causing a startling result. Once a PFAS molecule enters the environment, the chemical will remain unchanged forever.[50] Scientists only recently began studying elimination or the breakdown of PFAS molecules.[51]

Pollution has exposed the entire U.S. to PFAS.[52] PFAS is detected at very low levels, down to the nearest part per trillion (ppt).[53] An average U.S. citizen has approximately two micrograms of PFAS per liter of blood (μg/L).[54] A series of studies conducted by the New Hampshire Department of Health and Human Services found certain areas in the country with much higher concentrations of PFAS. One of the studies conducted by New Hampshire found an average of 33 micrograms of PFAS per every liter of blood (33 μg/L) in Ohio River Valley citizens, following the Parkersburg DuPont contamination.[55] This level of PFAS is 15 times higher than the average U.S. citizen. Another study showed even higher levels of PFAS in the blood of 3M workers in Alabama, at 1130 μg/L, which is over 500 times higher than the average U.S. citizen.[56] In fact, the Alabama 3M blood levels are nearly 1,500 times higher than EPA's lifetime exposure limit of 70 ppt.[57]

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[48] A water-soluble substance can dissolve in water. *Water-Soluble*, CAMBRIDGE ENGLISH DICTIONARY, https://dictionary.cambridge.org/us/dictionary/english/water-soluble (last visited Aug. 30, 2020).

[49] The destruction of organic compounds or chemical substances by microorganisms. Dennis D. Focht, *Biodegradation*, ACCESSSCIENCE MCGRAW HILL, https://www.accessscience.com/content/422025 (Nov. 2019); Willis Hon & Ed Roggenkamp, *The Emerging PFAS Framework: Testing, Reporting, and Response Obligations for Public Water Systems*, (Oct. 30, 2019), https://communication.nossaman.com/reaction/emsdocuments/PFAS%20PPT.pdf.

[50] While the chemical is currently titled as a "forever chemical" scientists are looking to change that. There are numerous ongoing studies underway with the ultimate goal of destroying PFAS in water. *See generally* Jansen, *supra* note 27.

[51] *See, e.g.*, *Microbe Chews Through PFAS and Other Tough Contaminants*, SCIENCEDAILY (Sept. 18, 2019), https://www.sciencedaily.com/releases/2019/09/190918083218.htm.

[52] *EWG Interactive Map*, *supra* note 38.

[53] One ppt is approximately the size of a grain of salt in an Olympic sized swimming pool; ppt is the same mathematical ratio as μg/L. *See* Hon & Roggenkamp, *supra* note 49, at 10.

[54] *PFAS Blood Testing*, *supra* note 29.

[55] *Perfluorochemicals (PFCs) Blood Test Results*, N.H. DEP'T OF HEALTH & HUM. SERVS. DIV. OF PUB. HEALTH SERVS. (Sept. 2017), dhhs.nh.gov/dphs/pfcs/documents/pfc-results-brochure.pdf.

[56] *Id.*

[57] For unit conversions sake, two micrograms per liter which is the equivalent to two ppb is equivalent to 2,000 ppt.

The most common use for these man-made chemicals is for its non-stick, hydrophobic[58] properties commonly found in household products such as Scotchguard, GORE-TEX, firefighting foam, textiles, and carpets.[59] Food packaging contains PFAS, including microwavable popcorn bags and fast food wrappers.[60] PFAS also creates the "non-stick" characteristic in popular Teflon cookware.[61]

When DuPont, 3M, and other corporations first manufactured products containing PFAS, the American consumer pereceived the PFAS products as trendy and convenient.[62] When PFAS first began to be used in manufactured goods, little environmental regulation existed.[63] Scientists paid by DuPont, 3M, and other chemical corporations tested PFAS in company-sponsored laboratory studies.[64] While the laboratory studies demonstrated the alarming effects PFAS had on human health and the environment, the corporations kept the concerning results of the PFAS studies to themselves.[65] Corporations did not need to hault production pending further studies to determine the negative effects of PFAS on human health and the environment.

Following the public health crisis in Parkersburg, many scientists conducted PFAS studies related to human health.[66] Many studies concluded that a direct link existed between PFAS pollution and serious life-threatening illnesses, including various cancers.[67] However, the U.S. Congress never seriously contemplated passing laws to protect the public health and the environment from PFAS pollution at the time.[68] Because of congressional

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58 Hydrophobic compounds have the chemical characteristic to repel water. *Hydrophobic*, MERRIAM-WEBSTER DICTIONARY, https://www.merriam-webster.com/dictionary/hydrophobic.

59 Matthew Thurlow, *Fear and Loathing of PFAS*, AM. BAR ASS'N (Dec. 27, 2018), https://www.americanbar.org/groups/environment_energy_resources/publications/trends/2018-2019/january-february-2019/fear-and-loathing/.

60 Marill, *Forever Chemicals Are in Your Popcorn and Your Blood*, *supra* note 29.

61 Blake, *supra* note 1.

62 *Id.*

63 *See id.*

64 Lerner, *The Teflon Toxin*, *supra* note 4.

65 *See* ENV'T WORKING GRP., *supra* note 22.

66 *See PFAS Blood Testing*, *supra* note 29.

67 U.S. ENV'T PROT. AGENCY, *supra* note 42, at 3; Matthew Thurlow, Russell Abell & Stephen Zemba, *Insight: PFAS Challenges Remain at EPA for Wheeler*, BLOOMBERG ENV'T (Oct. 3, 2018, 6:00 AM), [hereinafter Thurlow, *Insight: PFAS Challenges*], https://news.bloombergenvironment.com/environment-and-energy/insight-pfas-challenges-remain-at-epa-for-wheeler.

68 W. Kepner, *EPA and a Brief History of Environmental Law in the United States*, U.S. ENV'T PROT. AGENCY (June 15, 2016), https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NERL&dirEntryId=319430.

inaction, DuPont and other plants manufacturing PFAS lawfully polluted rivers, streams, lakes, and oceans with harmful "forever chemicals."[69]

More recently, Department of Defense ("DoD") locations using firefighting foams containing PFAS contaminated the drinking supply of nearby areas.[70] PFAS firefighting foams in DoD facilities seeped through the soil and PFAS eventually reached groundwater sources, where the PFAS has remained. Currently, over 400 DoD sites are affected by PFAS contamination and the number continues to increase.[71]

III. LAWS PROTECTING THE PUBLIC FROM PFAS EXPOSURE

Recently, the House of Representatives introduced the PFAS Action Act (H.R. 535), the first action protecting public health and the environment from PFAS pollution.[72] Prior to the PFAS Action Act of 2019, no congressional or EPA action mandated any PFAS standards. Due to EPA inaction, individual states began passing their own laws.[73] However, it is unlikely that all states will pass PFAS regulations. For one, some states are unlikely to adopt such legislation because a state's legislature might view such chemical regulations as a hinderance to the economic development of jobs and state income.[74] Thus, the creation of federally-mandated limits on PFAS pollution is critical in protecting human health and the environment.[75]

Rather than creating a specific PFAS law, Congress and EPA could choose to regulate PFAS under existing environmental laws that deal specifically with hazardous and toxic chemical substances. First, Congress should amend the Toxic Substance Control Act ("TSCA") to include provisions applicable to PFAS. Indeed, TSCA has not been widely used since its passage in the 1970s;

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69 *See* Thurlow, *Insight: PFAS Challenges*, *supra* note 67.

70 Sharon Lerner, *The US Military Is Spending Millions To Replace Toxic Firefighting Foam with Toxic Firefighting Foam*, INTERCEPT (Feb. 10, 2018, 9:00 AM), https://theintercept.com/2018/02/10/firefighting-foam-afff-pfos-pfoa-epa/.

71 Rebecca Beitsch, *Inspector General To Review DOD's Use of PFAS*, HILL (Oct. 16, 2019, 10:30 AM), https://thehill.com/policy/energy-environment/465937-inspector-general-to-review-dods-use-of-pfas.

72 PFAS Action Act of 2019, H.R. 535, 116th Cong. (2020).

73 *See Per- and Polyfluoroalkyl Substances (PFAS) | State Legislation*, NAT'L CONF. OF STATE LEGISLATURES (Mar. 11, 2020), https://www.ncsl.org/research/environment-and-natural-resources/per-and-polyfluoroalkyl-substances-pfas-state-laws.aspx.

74 As of September 2020, some states are addressing PFAS in various ways. See *PFAS*, SAFER STATES, https://www.huntonnickelreportblog.com/2019/03/pfas-states-not-waiting-for-epa/#:~:text=They%20include%20Alaska%2C%20California%2C%20Minnesota,Jersey%2C%20New%20York%20and%20Vermont.&text=As%20a%20likely%20precursor%20to,response%20level%20at%2070%20ppt (last visited Sept. 27, 2020).

75 Although it is important to explore the state laws, the main analysis of this Note will focus on federal law.

EPA can raise this law from the ashes and use it to effectively regulate PFAS. In other words, TSCA could be used as the primary means for achieving PFAS pollution prevention and mitigation. Second, the Comprehensive Environmental Recovery, Compensation, and Liability Act ("CERCLA") provides recovery and cleanup resources for communities affected by the pollution of harmful toxic substances. Designating PFAS as a toxic substance under TSCA and a hazardous substance under CERCLA would be worthwhile first steps in eradicating the "ineradicable" PFAS. Section III.A provides an overview of the TSCA statute and subsequent regulations and statutes which further strengthens EPA's power to control toxic substances. This Section also describes the first time EPA treated a PFAS chemical as a toxic substance, under the PFOA Stewardship Program. Section III.B outlines CERCLA by explaining cleanup actions, key terms, and the scheme in which a designated site achieves cleanup.

A. The Toxic Substances Control Act

Enacted in 1976, TSCA broadly charges EPA with the evaluation of the environmental and public health risks for then-existing and new chemical substances thereafter.[76] Leading up to TSCA's passage, industry's role in pollution started a movement for greater protections for public health and safety.[77] TSCA is one of several major pieces of legislation Congress passed in the 1970s in response to a public outcry for stricter pollution laws because many individuals were getting sick with aggressive cancers and other deadly diseases.[78] TSCA is a unique environmental law compared to others, including the Clean Water Act and the Clean Air Act because TSCA regulates pollution and chemicals across all environmental media and is not limited to air, water, or soil.

1. Purpose and Scope of TSCA

The Findings Clause of TSCA states that thousands of chemicals pose an "unreasonable risk of injury to health" to Americans every year.[79] TSCA's enactment centers around two purposes: (1) protecting human health and the environment through limiting or eliminating the pollution of toxic chemicals and (2) compromising with the chemical corporations so their manufacturing and business models are not crippled by federal pollution limits in TSCA.[80]

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[76] 15 U.S.C.A. § 2601 (West 2020).

[77] David Markell, *An Overview of TSCA, Its History and Key Underlying Assumptions, and Its Place in Environmental Regulation*, 32 WASH. U. J.L. & POL'Y 333, 343 (2010).

[78] *Id.* at 341 n.41.

[79] § 2601(a)(2).

[80] Robert B. Haemer, *Reform of the Toxic Substances Control Act: Achieving Balance in the Regulation of Toxic Substances*, 6 ENV'T LAW. 99, 103 (1999).

TSCA's Purpose Clause tasks EPA with three objectives.[81] First, EPA must develop toxicity information on all manufactured chemicals, considering both the effects on human health and the environment.[82] Second, EPA is required to manage, monitor, and regulate chemical substances based on the substance's toxicity information.[83] Third, if a chemical substance is labeled non-toxic, EPA must not impede developments of science, technology, or business of the chemical industry.[84]

TSCA regulates almost every possible manufactured chemical substance due to its broad statutory language.[85] TSCA defines "chemical substance" as "any organic or inorganic substance of a particular molecular identity, including any combination of such substances occurring in whole or in part as a result of a chemical reaction or occur[ence] in nature, and any element or uncombined radical."[86] TSCA excludes pesticides, tobacco products, cosmetics, foods, drugs, and nuclear materials.[87]

2. EPA's Role Under the Lautenberg Chemical Safety Act

In 2016, TSCA was amended by the Lautenberg Chemical Safety Act ("Lautenberg Act") which allows EPA to test new chemicals and the new use of existing chemicals.[88] By the early 2000s, it became apparent that the 1970s-era TSCA was out-of-date because of the advancements in technology since its initial passage.[89] The Lautenberg Act greatly expands EPA's role in reviewing, testing, and labeling chemical substances.[90]

EPA must enforce TSCA both "reasonabl[y] and prudent[ly]," considering the country's economic, environmental, and social impact in the context of chemical substances.[91] First, EPA must label a chemical substance as either a "high priority substance" or a "low priority substance" within 90 days of notification by the substance's manufacturer.[92] Chemical substance labeling

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81 *See* § 2601(b).

82 *Id.* § 2601(b)(1).

83 *Id.* § 2601(b)(2).

84 *Id.* § 2601(b)(3).

85 *See* Haemer, *supra* note 80, at 103 n.2.

86 § 2602(2)(A).

87 *Id.* § 2602(2)(B).

88 Valerie J. Watnick, *The Lautenberg Chemical Safety Act of 2016: Cancer, Industry Pressure, and a Proactive Approach*, 43 HARV. ENV'T L. REV. 373, 390 (2019).

89 Mitchell L. Guc, *TSCA and the Lautenberg Act: Bloated Regulation or Effective Legislation*, 49 U. TOL. L. REV. 461, 465–66 (2018).

90 *Id.* at 466–67.

91 § 2601(c).

92 *Id.* § 2605(b)(1)(C).

determines what types of regulations may be imposed on the substance, with "low priority" getting little to no regulation and "high priority" receiving strict restrictions on producing and discharging the substance.

If the substance gives EPA no concern about risk, the substance receives a "low priority" substance designation and the substance is free from any further potential regulation.[93] When EPA finds the substance *may* cause a risk after initial testing, the substance is given a "high priority" label.[94] The initial labeling of the substance is considered a "proposed rule" under the Administrative Procedure Act and is followed by a notice-and-comment phase to provide an opportunity for individuals and businesses to discuss their concerns or support for the substance's designation.[95] Following the notice-and-comment phase, EPA publishes a final rule, officially designating the chemical substance as high or low priority.[96]

Second, the EPA Administrator determines which chemical substances require testing. The determination to test a particular chemical substance is based on its already available information or manufactured quantities.[97] Also, a substance may be tested if EPA speculates potential use, or the substance is disposed or released.[98] The Administrator may mandate testing of a particular substance if the substance "may present an unreasonable risk of injury to health or the environment."[99] When EPA requires substance testing, the substance is tested through a variety of scientific studies, including toxicity and exposure reports.[100] All new substances and any new use for a substance must undergo an EPA review.[101]

3. PFOA Stewardship Program

A voluntary EPA PFAS "phase-out" process, known as the PFOA Stewardship Program, attempted to eliminate the manufacture of PFOA.[102] Starting in 2006, the Stewardship Program "invited eight major leading

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93 *Id.* §§ 2605(a), 2605(b)(1)(B), 2605(b)(4)(A).

94 *Id.* §§ 2605(a), 2605(b)(1)(B), 2605(b)(4)(A).

95 *See generally* 5 U.S.C.A § 553.

96 15 U.S.C.A. § 2605(b)(4)(H).

97 *Id.* § 2603(a)(1)(A).

98 *Id.*

99 *Id.*

100 Markell, *supra* note 77, at 354 n.101.

101 *New Chemicals Decision-Making Framework: Working Approach To Making Determinations Under Section 5*, U.S. ENV'T PROT. AGENCY 1–2 (Nov. 2017), https://perma.cc/VA5K-V2K8.

102 *Fact Sheet: 2010/2015 PFOA Stewardship Program*, U.S. ENV'T PROT. AGENCY, [hereinafter *PFOA Stewardship Fact Sheet*], https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-20102015-pfoa-stewardship-program (last visited Sept. 4, 2020).

companies"[103] to achieve a complete elimination of the manufacturing of PFAS by 2015.[104] The companies agreed to reduce the use of PFOA by 95% by 2010.[105]

In an effort to keep all participating companies honest, the Stewardship Program required each company to provide an annual report of PFOA use.[106] Companies wrote and submitted annual reports to EPA, but EPA's role in accountability of the companies' use and disposal of PFOA was limited.[107] While participating companies agreed to "cooperate" with EPA for the monitoring and testing of PFOA, EPA lacked any enforceability mechanism.[108] Since PFOA was previously used and allowed under TSCA until the early 2000s, companies were still authorized to pollute and manufacture PFOA.[109] The voluntary character of the Stewardship Program was EPA's best vehicle to eliminate PFOA manufacturing and hold companies accountable because important changes to TSCA had not yet been made.[110]

In the 2014 final annual report, all eight companies reported the near elimination of PFOA release and manufacture.[111] Since 2014, no additional reports or testing has taken place under the PFOA Stewardship Program to suggest companies have remained committed to eliminating PFOA release.[112] Additionally, the PFOA Stewardship Program was limited to controlling the release of PFOA and no other PFAS chemical.[113]

B. Superfund/CERCLA Law

The Comprehensive Environmental Response, Compensation, and Liability Act and later Superfund Amendments provide EPA with substantial

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103 The eight major companies are Arkema, Asahi, Ciba, Clariant, Daikin, DuPont, 3M/Dyneon, Solvay Solexis. *Id.*

104 *PFOA Stewardship Program Baseline Year Summary Report*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/pfoa-stewardship-program-baseline-year-summary-report (last visited Aug. 30, 2020).

105 *PFOA Stewardship Fact Sheet*, *supra* note 102.

106 *Id.*

107 *See id.*

108 *See id.*

109 *See Risk Management for Per- and Polyfluoroalkyl Substances (PFAS) Under TSCA*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfas (last visited Aug. 21, 2020).

110 *See supra* Section III.A.2.

111 *2010/2015 PFOA Stewardship Program—2014 Annual Progress Reports*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/20102015-pfoa-stewardship-program-2014-annual-progress (last visited Aug. 30, 2020).

112 *See id.*

113 *PFOA Stewardship Fact Sheet*, *supra* note 102.

authority to respond to hazardous substance cleanup.[114] The purposes of CERCLA are two-fold. First, CERCLA strives to achieve the cleanup of all abandoned hazardous sites. Second, CERCLA establishes liability claims for parties improperly disposing of hazardous waste.[115] Due to the chemical industries' role in creating, abandoning, and failing to control hazardous waste sites, CERCLA imposes taxes on the corporations to fund chemical emergency response and cleanup efforts.[116]

To impose liability on a polluter under CERCLA, the plaintiff must establish (1) the hazardous substance was disposed by a "facility"; (2) a release of a hazardous substance from the facility into the environment has occurred or may occur; (3) the release or threatened release has required or will require the expenditure of "response costs"; and (4) the defendant falls within one of the four categories of "potentially responsible parties."[117] Responsible parties include (1) current owners and operators of the facility, (2) owners and operators of the facility at the time, (3) any individual who arranged for the disposal of the substance, or (4) any individual who accepted the substance for the purpose of disposing of it.[118]

CERCLA provides long-term and short-term courses of action[119] for hazardous cleanup, which depend on the severity of the contamination and substance in question.[120] EPA is tasked with determining the course of action under a National Contingency Plan, which is the Agency's roadmap for responding to releases of hazardous substances under the various federal environmental laws, including CERCLA.[121] The National Priorities List designates a level of priority and urgency in restoring designated cleanup sites.[122] Under CERCLA, EPA must annually update a list of at least 400 contamination sites each year for the National Priorities List.[123] The National Priorities List

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114 *Superfund: CERCLA Overview*, U.S. ENV'T PROT. AGENCY, [hereinafter *Superfund: CERCLA Overview*], https://www.epa.gov/superfund/superfund-cercla-overview (last visited Aug. 30, 2020).

115 *See generally* William D. Evans, Jr., *The "Road Warrior" Quality of Superfund Contribution Litigation*, 32 TENN. BAR J., July/Aug. 1996, at 26.

116 *Superfund: CERCLA Overview, supra* note 114.

117 CAROLINE N. BROUN & JAMES T. O'REILLY, RCRA AND SUPERFUND: A PRACTICE GUIDE § 9:2 (3d ed. 2019).

118 *Id.*

119 *Superfund: CERCLA Overview, supra* note 114.

120 42 U.S.C.A. § 9605 (West 2020).

121 *National Oil and Hazardous Substances Contingency Plan*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/emergency-response/national-oil-and-hazardous-substances-pollution-contingency-plan-ncp-overview (last visited Sept. 3, 2020).

122 *Superfund: National Priorities List*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/superfund/superfund-national-priorities-list-npl (last visited Aug. 30, 2020).

123 *See* BROUN & O'REILLY, *supra* note 117.

ranks sites based on the severity of contamination and the level of hazard the specific substance presents.[124] CERCLA law applies when a polluter violates other environmental laws, including TSCA, the Clean Water Act, the Clean Air Act, and the Solid Waste Disposal Act.[125] Therefore, CERCLA relies on a substance's classification, definition, and guidelines under other federal law. A polluter's violation under CERCLA sets various other federal environmental laws in motion. CERCLA cleanup guidelines and substance pollution standards are established by pre-existing federal law.[126]

1. The Importance of "Hazardous Substance" Designation

Two toxicity designations exist under CERCLA—"hazardous substance" and "pollutant or contaminant."[127] A substance's designation of either "hazardous" or a "pollutant or contaminant" determines the cleanup guidelines under CERCLA. CERCLA's "hazardous substance" definition encompasses a comprehensive list of other federal environmental laws also outlining procedures and identification for substances labelled "hazardous," which include the Clean Water Act, Resource Conservation and Recovery Act ("RCRA"), Clean Air Act, and TSCA.[128] "Hazardous pollutant or substance" under other environmental laws is defined as substances causing adverse health effects and/or negatively impacting the environment.[129] Concentration, toxicity, persistence, and other characteristics raising significant health or environmental concerns determines a substance's hazard level.[130] The "pollutant or contaminant" definition differs from the "hazardous substance" definition. A "pollutant or contaminant" describes a substance "*after release* and *upon exposure* into the environment," which may cause disease or death through direct exposure or through the indirect exposure from the consumption of food chains.[131] While both definitions appear somewhat similar, the procedural, investigatory, and regulatory outcomes greatly differ under CERCLA based on the two definitions.

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124 *Id.*

125 *Id.* at § 9:19 (stating CERCLA only applies to substances, whereas RCRA applies to chemical, biological, and radiological waste).

126 *Id.*

127 42 U.S.C.A. § 9604 (West 2020).

128 *See id.* § 9601(14) (defining "hazardous waste" under § 311(b)(2)(A) of the Federal Water Pollution Control Act, § 3001 of the Solid Waste Disposal Act, § 307(a) of the Federal Water Pollution Control Act, § 112 of the Clean Air Act, and § 7 of the Toxic Substance Control Act). All of which provide procedures for identification of harmful and/or toxic materials that are being released or polluted in some way.

129 *Id.*

130 *See id.* §§ 6903, 6921.

131 *Id.* § 9601(33) (emphasis added).

A "hazardous substance" designation means whenever a threat or actual release of a substance exists, the EPA Administrator may take remedial action to prevent any further release.[132] The Administrator may also mandate a cleanup for the affected area.[133] Under a "pollutant or contaminant designation," EPA must find that a pollutant possesses an "imminent and substantial danger to public health and welfare" before any investigation or cleanup occurs.[134] Thus, more immediate prevention and action occurs under a hazardous substance definition.

Under the definition of "a pollutant or contaminant," a substance must first enter the environment before being subject to regulation.[135] Next, EPA, an expert, or a concerned individual, must show the harmfulness of the substance poses "imminent or substantial danger" demonstrating the likeliness of death or disease on the public health and welfare.[136] Under the pollutant or contaminant definition, no consideration is given to the destruction a substance may cause on ecosystems, waterways, or the environment as a whole.[137] EPA investigates and evaluates cleanup procedures only after an imminent or substantial danger to the public occurs.[138] While EPA investigates, the substance is continually being released (unless the polluter voluntarily agrees to halt release while EPA investigates). This delay in response for stopping a continued release of a harmful substance then makes a cleanup more difficult and expensive.

Remedial action may be taken prior to a release under "hazardous substance" whereas the release must first occur under "pollutant or contaminant." Additionally, remedial action must be taken when *any* release of a "hazardous substance" occurs, whereas remedial action may only be taken when the release of a "pollutant or contaminant" poses imminent and substantial danger. Therefore, the standard for taking remedial action is much higher for a "pollutant or contaminant."

IV. THE NECESSARY REGULATION OF THE ENTIRE PFAS FAMILY

Moving forward, swift action must be taken to implement PFAS regulations. This Note suggests looking to EPA's past experience in regulating an entire family of chemicals, specifically polychlorinated biphenyls ("PCB"). Section IV.A discusses how PCB is regulated under TSCA and CERCLA, especially following EPA's valuable PCB regulation known as the PCB "Mega-

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132 *Id.* § 9601(14).

133 *Id.* § 9604(a).

134 *Id.*; Melanie Bensch, *It's Time To Designate PFAS a "Hazardous Substance"*, ENV'T WORKING GRP. (July 3, 2019), https://www.ewg.org/news-and-analysis/2019/07/it-s-time-designate-pfas-hazardous-substance.

135 § 9601(33).

136 *Id.*

137 *Id.*

138 Bensch, *supra* note 134.

Rule." Section IV.B first outlines the unsuccessful action EPA has taken to eliminate and clean up PFAS contamination. Section IV.B further examines the application of PCB regulations to the PFAS family, suggesting successful outcomes if PFAS is regulated under TSCA and CERCLA.

A. PCB Regulation as a Model

PCB regulation provides an example of successful federal regulation of a large, harmful family of chemicals to protect the environment and public health. Prior to 1976, when federal PCB regulation began, landfills, waterways, and the air contained high amounts of PCB.[139] In fact, PCB's effect on human health was first discovered in 1930.[140] Concern surrounding PCB's effect on the environment began in the 1960s; however no legislative action to limit all PCB family use was taken until the late 1970s.[141]A general PCB ban currently exists in the U.S. because of the widespread PCB pollution across the country and the negative health effects caused by PCB.[142] Like PFAS, exposure to PCB is scientifically linked to a number of serious illnesses, including aggressive cancers, birth defects, brain and nervous system damage, and weakened immune and endocrine systems.[143]

PCB is a family of man-made chemicals with a high chlorine concentration. PCB is similar to PFAS because both types of chemicals are a highly halogenated organic compound—fluorine in PFAS and chlorine in PCB.[144] Fluorine atoms make up a high percentage of a PFAS molecule, while chlorine atoms make up a high percentage of a PCB molecule.[145] Like PFAS, PCB is indestructible, bioaccumulative, and resistant to high temperatures and pressure. Thus, PCB is also a "forever chemical" because of the chemical's

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[139] Polychlorinated Biphenyls (PCBs) Environmental Health Fact Sheet, ILL. DEP'T OF PUB. HEALTH, http://www.idph.state.il.us/envhealth/factsheets/polychlorinatedbiphenyls.htm (last visited Sept. 4, 2020).

[140] U.S. ENV'T PROT. AGENCY, POLYCHLORINATED BIPHENYLS 1929–1979: FINAL REPORT 3 (1979).

[141] *Id.* at 3–4, 5–7.

[142] *See generally Learn About Polyclorinated Biphenyls (PCBs) Health Effects*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs#healtheffects (last visited Aug. 20, 2020).

[143] *Human Toxome Project: Polychlorinated Biphenyls (PCBs)*, ENV'T WORKING GRP., https://www.ewg.org/sites/humantoxome/chemicals/chemical_classes.php?class=Polychlorinated+biphenyls+%28PCBs%29 (last visited Sept. 4, 2020).

[144] Stefan Schnieder, *Halogen Chemical Element Group*, BRITTANICA, www.britannica.com/science/halogen.

[145] *Id.* Fluorine and Chlorine are both members of the halogen group on the Periodic Table of Elements. *Id.* Halogens have similar chemical properties and have seven valence electrons, meaning the halogen group is able to form bonds with carbons and other organic compounds. *Id.*

biological persistence in living organisms and the surrounding environment.[146] Because of PCB's dangerous chemical properties and the risk to human health and the environment, Congress added a PCB Amendment to TSCA, banning manufacturing, processing, or distributing in commerce of PCB and other not "totally enclosed" uses of the chemical.[147]

While Congress saw the danger in PCB and stepped in to regulate the chemical family, PCB may not be as dangerous as PFAS. Even though some chemicals in the PCB family are non-toxic and do not pose a threat to public health or the environment, this did not hinder Congress, and EPA still imposed strict regulations to prevent further PCB pollution in the country. In fact, Congress added the entire class of PCB chemicals to TSCA, preventing the production, distribution, and manufacturing of PCBs in the U.S.[148] PCBs were also added to CERCLA and RCRA regulations to provide avenues for cleanup of PCB contamination sites based on the amount and severity of the PCB contamination.[149]

1. Regulating PCB Under TSCA

PCB is one of six chemicals specifically identified in TSCA.[150] A majority of the six chemicals have specific titles under TSCA.[151] Federal law provided broad direction to EPA, with respect to PCB rather than permitting EPA to exercise its own discretion in the regulation of PCB, overriding any initial EPA action with its own guidelines with respect to PCB.[152] Normally, EPA exercises its discretion in deciding whether to regulate certain chemicals by including them in the inventory of substances that need to be regulated. PCB-specific regulations do not, however, completely preclude EPA from further regulating other chemical substances not explicitly mentioned under TSCA.[153]

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146 *Id.*

147 Wendy Wilkie Parker, *Toxic Substance Control Act*, *in* 46 TEXAS PRACTICE SERIES: ENVIRONMENTAL LAW § 21.2 (2019).

148 *Polychlorinated Biphenyls* (*PCBs): Laws and Regulations*, U.S. ENV'T PROT. AGENCY https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs#lawsandregs (last visited Sept. 4, 2020).

149 *See generally* Ms. Barfield, *Where Does TSCA End and CERCLA Begin? Be All That You Can PCB*, ARMY LAW., June 2000, at 49.

150 The other five chemicals include asbestos, radon, lead, mercury, and formaldehyde. *Chemicals Under the Toxic Substances Control Act*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/chemicals-under-tsca (last visited Oct. 24, 2020).

151 *Toxic Substances Control Act (TSCA) and Federal Facilities*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/enforcement/toxic-substances-control-act-tsca-and-federal-facilities (last visited Aug. 30, 2020).

152 15 U.S.C.A. § 2614 (West 2020); 40 C.F.R. § 761.1 (2020).

153 *See generally* § 2614.

In chemical regulation situations, Congress provides EPA the ability to enforce statutory schemes minimizing or eliminating the manufacture or production of chemical substances outlined in TSCA.[154]

While Congress amended TSCA to include PCB, EPA regulated the manufacture and development of new and existing PCB chemicals under TSCA through the Office of Chemical Safety and Pollution Prevention.[155] Polluters are subject to TSCA when the PCB has a chemical concentration of 2 parts per million (ppm) or higher.[156] Any PCB substance at or above the 2ppm concentration is prohibited from being handled unless the chemical is used in an "entirely enclosed manner," meaning there is zero risk of exposure to humans and the environment.[157] EPA must find there is a zero risk of exposure to individuals or the environment prior to excusing PCB laws and regulations, and EPA regularly conducts evaluations to ensure potential polluters are continuing to ensure no risk of exposure.[158] PCB regulations prohibit the manufacture, processing, or distribution of the chemical substance at or above the 2ppm concentration, unless the industry fell within a slim category of those accepted uses, upon EPA approval.[159]

In 1988, EPA modified TSCA PCB regulations, now known as the "Mega Rule." The Mega Rule broadens the scope of restrictions on manufacturing and development.[160] The "Mega Rule" restricts the entire PCB chemical substance family, with some exceptions.[161] The strict regulations were passed after polluters attempted to skirt PCB regulations by creating new PCB chemicals which fell outside of EPA's control.[162] The Mega Rule put a stop to industry's "chemical creativity" by regulating more chemicals falling under the PCB chemical family with strict restriction on the handling of PCBs.[163]

2. Making Polluters Pay: PCB Hazardous Substance Designation and CERCLA

PCB regulations demonstrate the importance of "hazardous substance" designation under TSCA and how CERCLA is applicable. If any cleanup takes

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154 *Id.*

155 Parker, *supra* note 147.

156 *Id.* at § 21:3.

157 *Id.*

158 *Id.*

159 *Id.*

160 40 C.F.R. §§ 761.20, 30, 35 (2020).

161 *Id.* §§ 761.1–3.

162 Lauren MacLanahan, *Polychlorinated Biphenyls and the "Mega Rule:" Will It Have the Mega-Impact the EPA Desired?*, 24 WM. & MARY ENV'T L. & POL'Y REV. 345, 348–49 (2000).

163 Parker, *supra* note 147.

place, a substance or family of substances must be recognized under the "Designation of Hazardous Substances" regulation.[164] The regulation includes a comprehensive list of all hazardous substances monitored by EPA.[165] Because PCB is a "hazardous substance," a polluter must conduct a cleanup project under CERCLA when EPA makes a determination regarding PCB contamination.[166]

PCB regulations under TSCA should not conflict, restrict, or affect other federal environmental laws, including CERCLA. In the event PCB regulations unintentionally overlap between TSCA and other federal environmental laws, EPA must take the strictest approach to restricting the pollution of PCBs.[167] For PCBs, if the TSCA "Mega Rule" regulations conflict with other PCB standards under CERCLA or RCRA, the most stringent restrictions and regulations of PCB cleanup are applied.[168]

EPA outlines how facilities must conduct their PCB cleanups, including three possible avenues. The first are known as "self-implementing" cleanups.[169] Self-implementing cleanups require the responsible polluter to conduct the cleanup process, pursuant to relevant disposal guidelines for remedial waste.[170] The second are "performance-based" cleanups, which require the polluter to remove enough PCB to achieve an acceptable level (below 2 ppm) and send the waste to an appropriate disposal facility.[171] The third avenue allows a facility to coordinate with EPA in developing its own cleanup strategy, not outlined in the first two options.[172] In this situation, EPA must first approve the facility-based cleanup plan before any disposal or removal of PCB waste.[173]

The PCB Mega Rule also establishes two categories for PCB remediation under CERCLA depending on the health and environmental risks associated with certain levels of PCB concentration.[174] These two categories are (1) stringent cleanup based on a classification of high-risk standard and (2) a site-

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164 Designation of Hazardous Substances, 40 C.F.R. § 302.4(b).

165 *Id.*

166 *Benefits of the PCB Cleanup and Disposal Program,* U.S. ENV'T PROT. AGENCY, https://www.epa.gov/pcbs/benefits-pcb-cleanup-and-disposal-program (last visited Aug. 30, 2020).

167 Barfield, *supra* note 149.

168 *Id.*

169 *Benefits of the PCB Cleanup and Disposal Program*, supra note 166.

170 *Id.*

171 *Id.*

172 *Id.*

173 *Id.*

174 *Managing Remediation Waste from Polychlorinated Biphenyls (PCBs) Cleanup*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/pcbs/managing-remediation-waste-polychlorinated-biphenyls-pcbs-cleanups (last visited Aug. 30, 2020).

by-site application cleanup for varying risks.[175] Sites may be exempted from the Mega Rule.[176] A site-by-site determination is made by EPA to determine what category of cleanup the facility must use.[177]

The existing PCB regulations under TSCA both successfully bans toxic PCB chemicals from being manufactured or discharged and cleans up sites contaminated with toxic PCB chemicals. PCB contamination sites are efficiently identified and properly registered on the National Priorities List.[178] Clear regulations with narrow exceptions on the PCB chemical group have assisted EPA in responding quickly to the illegal production of PCB by a facility and identification of contamination sites holding toxic PCB.

B. PFAS Needs Strict Pollution Limits, and Fast!

Numerous investigative journalism reports and documentaries such as *The Devil We Know* and the recent movie, *Dark Waters*, have caused an outcry from the public, demanding answers regarding PFAS contamination.[179] Chemical corporations have manufactured PFAS since the 1950s, yet most individuals around the country are unaware of its harmful effects, especially the impact common consumer items may have on their health. However, today PFAS contamination is now widely known throughout the country, especially in communities where past or current PFAS manufacturing takes place.

In response to public outrage, EPA created the PFAS Task Force in 2019.[180] The PFAS Task Force was established to investigate the potential dangers the PFAS family has on the environment and human health.[181] With the creation of the Task Force came voluntary PFAS pollution measures.[182] Specifically, EPA implemented non-binding regulations that "warned" the public about PFAS dangers.[183]

On the other hand, the U.S. House of Representatives passed the first comprehensive legislation regarding the regulation of PFAS, titled the PFAS Action Act of 2019 in January 2020.[184] Congress passed the Act as a result of EPA's inaction in 2019 and the danger PFAS chemicals cause to the public and

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175 *Id.*

176 *Id.*

177 *Id.*

178 Establishing Remedial Priorities, 40 C.F.R. § 300.425(b) (2020).

179 THE DEVIL WE KNOW, *supra* note 37; DARK WATERS, *supra* note 37.

180 *EPA's PFAS Action Program*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/pfas/epa-actions-address-pfas (last visited Aug. 30, 2020).

181 *Id.*

182 *Id.*

183 *Id.*

184 PFAS Action Act of 2019, H.R. 535, 116th Cong. (2020).

the environment. However, the future for PFAS regulation is still unclear as the PFAS Action Act of 2019 must still be acted upon by the U.S. Senate[185] and thereafter faces a potential veto from the U.S President.[186] Moreover, subsequent EPA rulemaking action may affect the effectiveness of the U.S. House's passed legislation.[187]

1. EPA's Failed PFAS Action Plan

i. The PFOA Stewardship Program Is Not Enough

The Stewardship Program is flawed.[188] First, the program only includes one specific PFAS chemical, PFOA. Eliminating only one PFAS chemical does not protect the public from the future manufacturing of other PFAS chemicals, especially certain PFAS already in human blood.[189] The Stewardship Program does not prevent or limit the manufacture of the entire PFAS chemical group.[190] Second, the program provides companies with an easy loophole: create or manufacture a technically new PFAS chemical with slight molecular alterations even if the "new" chemical will cause the same negative health and environmental consequences as PFOA. The loophole allows the chemical industry to continue to profit at the expense of human health and the environment. Indeed, with the slightest alterations, dangerous PFAS chemicals fall outside the regulatory "control" of the Stewardship Program. The corporations are therefore under no pressure to discontinue the manufacture of PFAS entirely. However, the Stewardship Program is merely voluntary, and the industry is able to manufacture PFAS again without facing any repercussions. Consequently, the manufacturing of PFAS still poses a threat to human health and safety despite the discontinuation of the specific PFOA chemical.

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185 David Schultz, *House PFAS Bill Has "No Prospect" in Senate, Barrasso Says (1)*, BLOOMBERG L. (Jan. 8, 2020), https://news.bloomberglaw.com/environment-and-energy/house-pfas-bill-has-no-prospects-in-senate-barrasso-says.

186 OFF. OF MGMT. & BUDGET, EXEC. OFF. OF THE PRESIDENT, STATEMENT OF ADMIN. POL'Y H.R. 535–PFAS ACTION PLAN OF 2019 (Jan. 7, 2020).

187 Announcement of Preliminary Regulatory Determinations for Contaminants on the Fourth Drinking Water Contaminant Candidate List, 85 Fed. Reg. 14098 (Mar. 10, 2020) (to be codified at 40 C.F.R. pt. 141).

188 *See generally Poisoned Legacy: The Problem with Phase Outs*, ENV'T WORKING GRP. (May 1, 2015), https://www.ewg.org/research/poisoned-legacy/problem-phase-outs.

189 *Risk Management for Per and Polyfluoroalkyl Substances (PFAS)*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfas (last visited Aug. 30, 2020); *PFAS Blood Testing*, *supra* note 29.

190 *Id.*

Meanwhile, new harmful PFAS chemicals emerge while the "eight major leading corporations" continue to profit.[191]

Further, the loophole lacks transparency because EPA is required to release newly manufactured chemicals to the public including newly developed PFAS chemicals that are either in the process of manufacture or were recently introduced into the consumer market. In fact, "EPA's most recent chemical inventory . . . in March [of] 2019" contained over 7,000 chemicals.[192] These chemicals are all kept secret and away from the public eye.[193] This is problematic because while EPA claims to be regulating PFAS, the public is unable to keep the government and the chemical corporations in check. When chemical inventories are kept private, EPA and the manufacturing corporations have no accountability to the public-at-large. Harmful chemicals are kept a secret from the public and severe medical illnesses remain a mystery to those without chemical inventory information.

Overall, EPA's Stewardship Program was poorly planned and shortsighted. Under the Program's scheme, chemical corporations may theoretically change their chemical substance products every day with advanced technology and science.[194] The voluntary Stewardship Program could not possibly eradicate all manufacture of PFAS. For an industry with a record of choosing profits over people, EPA's reliance on a voluntary program is woefully inadequate.

Considering the Program's shortfalls, labeling PFAS "toxic" and "hazardous" under existing federal law is critical. This would achieve three goals. First, federal law would prevent a national public health and environmental crisis. Second, federal law would provide necessary cleanup assistance for communities affected by PFAS contamination. Third, federal law would apply to the entire PFAS family, meaning any substance fitting a specific PFAS chemical chain formula. A formula approach would adequately group past, present, and future PFAS chemicals that demonstrate the same harmful environmental and public health impacts.

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191 *Id.*

192 Sharon Lerner, *EPA Allowed Companies To Make 40 New PFAS Chemicals Despite Serious Risks*, INTERCEPT (Sept. 19, 2019), https://theintercept.com/2019/09/19/epa-new-pfas-chemicals/; *see also e.g.*, *About the TSCA Chemical Substance Inventory*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/tsca-inventory/about-tsca-chemical-substance-inventory#howare (last visited Aug. 30, 2020).

193 *About the TSCA Chemical Substance Inventory*, *supra* note 192.

194 *Id.*; *Fact Sheet: 2010/2015 PFOA Stewardship Program*, *supra* note 102.

ii. Minimal Agency Action Following the PFOA Stewardship Program

The initial action taken by EPA included a non-regulatory lifetime Health Advisory for PFAS exposure. EPA issued health advisories to the public as general warnings, discussing the danger of certain PFAS substances and waste.[195] In February 2019, EPA unveiled a "PFAS Action Plan" outlining future steps, expectations, and goals the Agency aims to achieve in order to protect public health and the environment. However, the Action Plan investigates only the two well-known PFAS chemicals, PFOS and PFOA while all other toxicity testing or further investigations into the potential harm other PFAS substances are left out.[196] Limiting EPA investigations to two PFAS substances fails to provide adequate and complete toxicity studies.

Despite the limited nature of EPA's PFAS toxicity studies, EPA has failed to reach its deadline on providing the results of the toxicity studies. Despite becoming aware of PFAS contamination in 2012, EPA has only managed to provide non-binding health advisories and create a plan.[197] While PFAS has existed in the chemical industry for decades, few scientific studies are conducted outside of the chemical industry's labs. With PFAS entering the public discussion, scientists have started researching and testing the toxicity and harm PFAS may cause to the human body and the surrounding environment and ecosystems.

Since 2018, PFAS has been linked to a significant number of illnesses and human health dangers. Among other things, PFAS is linked to the harm of the female reproductive system,[198] regressed childhood bone health and development,[199] lower birthweight in infants,[200] weight gain, weakened

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[195] *Drinking Water Health Advisories for PFOA and PFOS*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos (last visited Aug. 30, 2020).

[196] *EPA's Per- and Polyfluoroalkyl Substances Action Plan,* U.S. ENV'T PROT. AGENCY (Feb. 2019), https://www.epa.gov/sites/production/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf (last visited Aug. 30, 2020).

[197] *Id.*

[198] Wei Zhou, Lulu Zhang, Chianliang Tong, Fang Fang et. al, *Plasma Perfluoroalkyl and Polyfluoroalkyl Substances Concentration and Menstrual Cycle Characteristics in Preconception Women*, 125 ENV'T HEALTH PERSPS. 1 (2017).

[199] *See generally* Rachel Cluett, Shravanthi M. Seshasayee, Lisa B. Rokoff, Sheryl L. Rifas-Shiman et. al, *Per- and Polyfluoroalkyl Substance Plasma Concentrations and Bone Mineral Density in Midchildhood: A Cross-Sectional Study*, 127 ENV'T HEALTH PERSPS. 1 (2019).

[200] *See generally* Eva Negri, Francesca Metruccio, Valentina Guercio, Luca Tosti et. al, *Exposure to PFOA and PFOS and Fetal Growth: A Critical Merging of Toxicological and Epidemiological Data Study*, 47 CRITICAL REVS. TOXICOLOGY 482 (2017).

childhood immunity, and increased cholesterol.[201] PFAS exposure has also been shown to cause a variety of cancers, including liver,[202] testicular,[203] kidney,[204] pancreatic,[205] leukemia,[206] and other diseases, including osteoarthritis[207] and thyroid disease.[208]

Perhaps EPA's most shocking PFAS action is allowing chemical corporations the opportunity to test their own PFAS substances.[209] The chemical manufacturers report the findings and conclusions of the PFAS studies to EPA for a final determination on the toxicity of the PFAS substance.[210] In fact, EPA gave DuPont–Chemours the responsibility to test other, potentially harmful, PFAS chemicals for toxicity.[211] That's right: *DuPont*, the same company that poisoned the community of Parkersburg, West Virginia; that knew about the toxicity of PFOA in its facility but failed to implement any safety measures for employees handling the chemicals; that dumped PFOA into the Ohio River and other surrounding waterbodies causing individuals in the community to become seriously ill; that doctored the scientific studies so PFOA appeared non-toxic; that avoided handing over emails and documents proving the company covered up PFOA toxicity; and that reached a settlement with the Parkersburg community

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201 *"Forever Chemicals:" Teflon, Scotchgard and the PFAS Contamination Crisis*, ENV'T WORKING GRP., https://www.ewg.org/key-issues/toxics/nonstick-chemicals (last visited Aug. 30, 2020).

202 *See generally* Valentino Gallo, Giovanni Leonardi, Bernd Genser, Marie-Jose Lopez-Espinosa et. al, *Serum Perfluorooctanoate (PFOA) and Perfluorooctanoate (PFOS) Concentrations and Liver Function BioMarkers in a Population with Elevated PFOA Exposure Study*, 120 ENV'T HEALTH PERSPS. 655 (2012).

203 *See generally* Verónica M. Vieira, Kate Hoffman, Hyeong-Moo Shin, Janice M. Weinberg et al., *Perfluorooctanoic Acid Exposure and Cancer Outcomes in a Contaminated Community: A Geographic Analysis*, 121 ENV'T HEALTH PERSPS. 318 (2013).

204 *See generally* D. Consonni, Kurt Straig, J. Morel Symons, John A. Tomenson et al, *Cancer Risk Among Tetrafluoroethylene Synthesis and Polymerization Workers*, 178 AM. J. EPIDEMIOLOGY 350 (2013).

205 *See generally* Vieira et al., *supra* note 203.

206 *Id.*

207 *See generally* Kim E. Innes, Alan E. Ducatman, Michael I. Luster & Anoop Shankar, *Association of Osteoarthritis with Serum Levels of the Environmental Contaminants Perfluorooctanoate and Perfluorooctane Sulfonate in a Large Appalachian Population Study*, 174 AM. J. EPIDEMIOLOGY 440 (2011).

208 *See generally* David Melzer, Neil Rice, Michael H. Depledge, William E. Henley et. al, *Association Between Serum Perfluorooctanoic Acid (PFOA) and Thyroid Disease in the U.S. National Health and Nutrition Examination Survey*, 118 ENV'T HEALTH PERSPS. 686 (2010).

209 *See generally* Lerner, *supra* note 192.

210 *Id.*

211 *Gen X Chemical Studies*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/pfas/genx-chemicals-studies (last visited Aug. 30, 2020).

over PFAS contamination but have not paid the plaintiffs a single penny of the compensation DuPont promised.

EPA allowed DuPont to provide EPA toxicity results on another PFAS chemical substance the company is manufacturing and producing. Giving the chemical corporations the power to conduct its own scientific studies with PFAS chemicals it produces and profits on is alarming. It is unreasonable to expect the chemical industry will self-regulate by providing adequate scientific results pertaining to its own highly toxic chemicals. The people must demand that the government, not chemical corporations, investigates the toxicity of all PFAS chemicals to ensure future generations will no longer be affected by such a dangerous class of substances.

2. The PFAS and PCB Parallel

Successful PFAS regulation will begin by regulating the entire PFAS family, just like PCB regulations. TSCA mainly regulates PCB, which sets limits on the pollution of PCB across all environmental medias of air, water, and soil. While regulation of chemicals may be successful under environmental "media-specific" laws like the Clean Air Act or Clean Water Act, the PCB and PFAS chemical classes are dangerous to the environment in all forms of media. Therefore, the most effective and efficient regulation is under TSCA because the law can regulate all media. Maximum pollution amounts outlined in TSCA apply to all media-specific environmental laws, which is the most efficient way to regulate any class of chemicals, including PCB and PFAS.

While a large number of chemicals may make up the entire families, this does not excuse an entire family of potentially harmful chemicals from regulation. Chemical families are determined by each chemical's similar molecular structure and characteristics, including hazardous effects on the body including teratogens, mutagens, and carcinogens. When individual substances demonstrate a serious threat to human health or the environment, a regulatory presumption must exist: the common harmful chemical characteristic throughout the entire chemical family is presumptively present in the entire chemical family.

EPA should take a preferred approach of treating every substance within a chemical family as hazardous when evidence suggests some of the substances within the chemical family are hazardous. When dealing with toxic substances, the Precautionary Principle[212] must apply: it is better to err on the side of safety and protect the public, while EPA conducts further research on the entire chemical class, rather than regulating only the few known toxic substances within the chemical class. Characterization of a chemical into a class or family or group means the chemicals are similar in a potentially toxic or hazardous way and each substance within the class must be treated with skepticism. In the case

[212] *See generally* Noah Sachs, *Rescuing the Strong Precautionary Principle from Its Critics*, 2011 ILL. L. REV. 1286 (2011).

of PCB, all PCB chemicals were treated in such a manner. All PCBs were effectively banned until scientists could conduct all necessary tests to evaluate and conclude the necessary safety risks associated with the PCB chemical class. PFAS must be approached in an identical fashion: through aggressive regulation. A PFAS toxicity presumption must exist because PFAS chemical's fundamental, molecular structure may be toxic and hazardous. Most PFAS chemicals have not been adequately evaluated by scientific studies to determine toxicity levels.

PFAS must be strictly regulated going forward, even if certain chemicals within the class are found non-toxic or cause only acute health and environmental problems. EPA must fulfill its purpose to protect the environment and public health. If EPA does not regulate the PFAS family and fails to establish a hazardous presumption for hazardous chemical families, the agency is failing to fulfill its essential function.

A "hazardous" designation may be overcome for non-toxic chemicals within a hazardous chemical family. Specific substances producing valid, conclusive scientific data demonstrating the substance's non-hazardous traits may be excused from strict regulations. After all, 200 PCB chemicals[213] and 7,000 substances for PFAS[214] exist. Some PFAS and PCB substances may be non-toxic and non-hazardous. Waiving or excusing certain safe substances from regulation has proven to be successful in PCB regulations. To err on the side of public protection, EPA evaluates and concludes as an agency that the specific PCB substances that are safe to produce, manufacture, or dispose of. Furthermore, EPA may still implement maximum concentrations or amounts of the safe PCB substance to ensure environmental safety and protection of public health.

3. A Regulatory Middle Ground for Unknown Substances

A middle ground of regulation must exist in addition to establishing a "hazardous" designation on unknown and untested substances within a chemical family. Modifying TSCA's regulatory scheme specifically for unknown and untested substances would safeguard public health and the environment, while facilitating limited manufacture of chemicals, known as "middle ground" regulations. The "middle ground" TSCA regulations would allow temporarily limited manufacture of new or untested substances while unbiased scientific studies are conducted to determine the substance's toxicity. The regulatory frameworks suggested in this Subsection are merely temporary, and not

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213 *Guidelines for the Identification of PCBs and Materials Containing PCBS*, U.N. ENV'T PROGRAMME, (Aug. 1999), http://chm.pops.int/Portals/0/download.aspx?d=UNEP-POPS-PCB-GUID-IDENT.English.PDF.

214 *Per- and Polyfluoroalkyl Substances (PFAS)*, U.S. FOOD & DRUG ADMIN., https://www.fda.gov/food/chemicals/and-polyfluoroalkyl-substances-pfas (last visited Aug. 30, 2020).

permanent, "middle ground" TSCA regulations that must be lifted at the conclusion of toxicity studies.

EPA or chemical manufacturers may undergo the toxicity study of a substance. If the manufacturer decides to conduct its own study, the manufacturer must complete other tasks in order to ensure the validity of its toxicity studies. First, the manufacturer must provide quarterly reports to EPA on the progress of the toxicity and scientific studies. Once the manufacturer's study is complete and concludes whether or not the substance is hazardous, an EPA Toxicity Review Committee, comprised of toxics scientists and academics, would review the manufacturer's studies and evaluate its validity and value.

The Toxicity Review Committee's conclusions would either find in favor of the study and agree with the conclusions on the toxicity of the substance(s) or would disagree with the manufacturer's study and order EPA to conduct its own testing regarding the toxicity of the substance(s) in question. If the manufacturer allows EPA to conduct its own testing, it is unnecessary for the Review Committee to determine the EPA study's conclusions. When EPA is ordered to study and evaluate the toxicity of a manufacturer's substance by the Toxicity Review Committee, EPA's study would be reviewed by the Toxic Review Committee one last time to determine whether inconsistencies and scientific discrepancies exist between EPA's study and the manufacturer's initial study. If flagrant inconsistencies exist, EPA may establish consequences for the manufacturer.

While scientific testing by the manufacturer, EPA, or both take place, the manufacturer may continue to produce the unknown substance at limited daily quantities determined by the Agency. EPA would be required to provide criteria on the limited quantities for each unknown substance, using preliminary data focused on the chemical family of the substance. Limited daily quantities provide a compromise between the chemical industry and EPA. Because the substance's toxicity is unknown or unconfirmed, studies would determine whether the substance is toxic or non-toxic. While manufacturers and EPA await results on the toxicity study, manufacturers may produce some of the substance so as to not seriously punish manufacturers if the substance is determined to be non-toxic. On the other hand, limiting the quantities protects public health and the environment by limiting the potential harmful effects of the substance if it is found to be toxic and harmful.

Once the EPA Review Committee or EPA concludes its study on the unknown substance, the present regulatory framework under TSCA and CERCLA would take over. If the substance is "hazardous" under CERCLA and/or a "high priority" substance under TSCA, further restrictions on the substance would be imposed. On the other hand, if the substance is labelled a "pollutant or contaminant" under CERCLA and/or a "low priority" substance under TSCA, limited or no restrictions on the substance would occur. The process outlined in this Section is merely temporary, and reasonable timelines for the conducted studies must be explicitly stated. A manufacturer may find this

restriction to be unfairly punishing the chemical industry, however the manufacturer's liability would be limited under CERCLA because the "middle ground" regulations would act to limit the daily pollution of the substance, if it is later found to be toxic.

V. CONCLUSION

Congressional action is imperative to ensure maximum health and environmental outcomes for the nation. Although EPA wields a great deal of power to investigate chemical substances under existing federal environmental laws, Congress must direct EPA to act on PFAS in ways Congress, not EPA, sees fit. EPA must abide by congressional action, regardless of EPA's PFAS Action Plan.

By adding a PFAS section to TSCA, the entire class of PFAS chemicals would be tightly restricted across all important federal environmental laws. Including PFAS in TSCA regulations would require responsible facilities to pay for PFAS contamination under CERCLA. Communities like Parkersburg would no longer live in fear of developing rare and aggressive forms of cancer because CERCLA would require DuPont–Chemours to clean up its PFAS pollution. PFAS regulations under TSCA will not harm the industry either. Safe, non-hazardous PFAS substances are subject to waiver of TSCA restrictions. Public health and environmental safety must come before the profits of chemical corporations. If PFAS regulation is left in the hands of EPA, immediate and effective action is unlikely to occur. PFAS chemicals will continue to enter the environment and human bloodstream every day. Overall, swift PFAS action must be taken to avoid another PFAS catastrophe like Parkersburg, WV, and a PFAS amendment to TSCA would ensure the protection of public health and the environment.

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